

An approach on the survivorship of giant panda in wild

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Abstract: The endangered giant panda (*Ailuropoda melanoleuca*) is endemic to the mountains of Sichuan, Gansu and Shaanxi Provinces in China. The species had numbered over 2000 animals in early 1970s, but declined to no more than 1,000 animals fragmented into perhaps 32 subpopulations in late 1990s as the result of numerous detrimental forces such as habitat shrinking, poaching and bamboo flowering. The mass flowering and followed die-off of bamboo played key roles in the declination of panda population in the past three decades. It triggered the starvation and following high mortality of giant pandas in 1970s over Min Mountains and in 1980s across Qionglai Mountains in Sichuan Province. The situation of survivorship is made worse by the fact that the panda habitat is fragmented into many small "islands", each containing only a few pandas. Such small, isolated panda populations are rendered even more vulnerable to extinction form threats such as habitat degradation, natural disaster, disease, and the deleterious effects of inbreeding. So restoring the panda habitat and reintroduction pandas to their historical habitat might be an important issue for protecting the giant panda in wild.

Keywords: Giant panda; Population dynamics; Bamboo flowering; Survivorship; Conservation; Reintroduction

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Introduction

Wildlife is a major part of the natural ecological system and a precious wealth of human world. The protection of wild life plays a key role in protecting the ecological equilibrium, improving the natural environment, maintaining the biodiversity, developing scientific research, enriching human beings cultural lives, and promoting the sustainable development of human society. Giant panda (*Ailuropoda melanoleuca*) is an international favorite animal among the most rare species in the world. Ever since Pére Armand David, a missionary and avid collector of museum specimens, first saw a skin of "the famous black and white bear" back in 1869, no one species has attracted as much attention in the western world as China's giant panda (Carter 1999; Reid 1991; Taylor 1991).

Fossil evidence has demonstrated that in the late Pleistocene, 0.7 million years ago, the giant panda was widely distributed in Myanmar (Burma), northern Vietnam, and much of eastern and southern China as far north as Beijing. Its range has contracted through climatic change, and in recent centuries, increasing human settlement. The species is now restricted to six isolated mountain ranges in the Sichuan, Gansu and Shaanxi provinces along the eastern edge of the Tibetan Plateau. The remaining area of suitable panda habitat totals about 29 500 km² (Hu 1985).

In 1958, WWF (World Wide Fund, former World

Wildlife Fund) adopted giant panda as its international logo (Hu 1985). In 1984, due to its dwindling numbers, the U.S. Fish and Wildlife Service listed it as an endangered species under the Endangered Species Act. The protection prohibits giant panda from being imported into U.S. except under certain conditions (Fish & Wildlife Service 1998). As a national treasure of China, Chinese government also listed the giant panda as the first priority endangered species and invested heavily to its protection. Despite the survivorship and protection of giant panda are attracting scientific attention worldwide, the population in wild has declined rapidly during the past three decades (O'Brien 1987; Schaller 1987; He 1998; Guo 1999).

Population declining of giant panda

Population in 1970s

From 1974 to 1978, leaded by Hu Jingchu (Sichuan Province), Wu Jiayan (Shaanxi Province), and Zhang Fuyong (Gansu Province), about 3 000 Chinese scientists conducted a census of the remaining wild pandas. It was estimated that about 2 000 animals were alive (Xiongmao Jiayuan Web: <http://www.scstic.ac.cn/Chinese/Travel/panda>). To urge the conservation process of this treasure animal, the official figure was only announced about 1 000 (Hu 1985; O'Brein, 1987). But unfortunately the official figure had become fact one decade later.

Population in 1980s

One intensive survey was conducted by World Wildlife Fund-China and was completed in 1988. The

scientists covered thousands of miles of panda country high up in the mountains of Sichuan and neighboring provinces. It was estimated that about 872 to 1 352 pandas being alive in the wild. The high end of this estimate was probably closest to the truth (Zoological Society of San Diego 1999). In 1994, MacKinnon and De Wulf (1994) have used satellite imagery to estimate the total area inhabited by Giant Pandas, and expect a total population of 1 200 pandas split into 32 fragmented populations (Fig. 2).

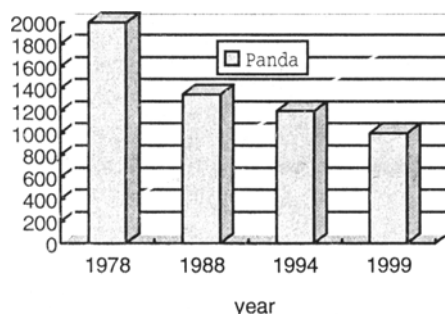


Fig.2 Giant panda population in wild

Population in 1990s

Since the estimate of population needs better censuses, Chinese scientists have applied DNA Finger Printing Method to identify the population size in wild (He 1998; Wei 1999; Yang 1999). For example, Ou Weifu and his colleagues used DNA techniques to investigate the wild population in Tangjiahe Nature Reserve (Ou 1999). Their result shows that there are 37 giant pandas belonging to 6 families surviving in the reserve. It also shows that the wild population in this well-managed reserve has reduced from 44 to 37 animals in the past five years.

Although the new survey is on going and has no absolutely accepted figure of giant pandas in the wild this moment, it is very clear that it is too far to say that we have already controlled the declination of the population of giant panda. From recently reports (Tab. 1), it is estimated that at least 10% of giant pandas have already disappeared since 1994. So, no matter what feelings we have, the wild population of giant panda might be much less than our expected, as few as 1 000 animals.

Tab.1. Population dynamics of giant panda in some reserves

Reserve Name	Location	Panda (year)	Panda (Year)	Recent date resources
Wuyipeng(Wolong)	Wenchuan, Sichuan	27(1994)	24(1998)	Zhang, 2000
Wolong (Except Wuyipeng)	Wenchuan, Sichuan	100(1985)	86(1998)	Zhang, 2000
Tangjiahe	Qinchuan, Sichuan	44(1992)	37(1999)	Ou, 1999
Daxiangling	Sichuan	8(1991)	5(1999)	Fang, 1999
Foping	Fuping, Shaanxi	240(1980)	65(1998)	Zhao, 1999
Taibaishan	Shannxi	20(1988)	11(1996)	Ma, 1999
Daxiangling	Sichuan	8(1995)	6(1998)	Fang, 1999

Reasons for the population declination

Habitat destruction

Available giant panda habitat has been severely reduced by logging and forest clearance for agricultural settlement. In early 1950s, giant pandas occupied about 51 103 km² as their habitat. With agricultural development and forest cutting, this habitat reduced to 13 823 km² in 1974, only about 17% of that in 1950s. In 1990, the figure continues shrinking to less than 11 000 km² (Xongmao Jiayuan Web, 1999). Much worse, because most of the valleys are inhabited by people, many panda populations are isolated in narrow belts of bamboo, no more than 1 000-1 200 m in width. Panda habitat is continuing to disappear as settlers push ever higher up the mountain slopes (Servheen 1990; Menhu 1989; Taylor 1991).

Another kind of habitat destruction is habitat fragmentation. A recent research in Wolong Giant Panda Reserve shows that in this famous reserve, only 90.36 km² (4.47%) of the total area is most suitable for giant panda living, the suitable area is 226.42 km²

(11.19%), the moderately suitable area is 286.09 km² (14.13%), and 177.91 km² (8.8%) is marginally suitable area (Cheng, 1999). It means that more than 60%, about 1 236.51 km² is completely unsuitable for giant panda living. Even the most suitable area and suitable area for giant panda are in extremely fragmented situation from spatial distribution, which reduced the carrying capacity of giant panda in the reserve.

Catching and Poaching

From 1936 to now, at least 260 giant pandas have been caught from the field for Zoos both in China and around the world (Etling 1999). Since 1949, just in Fengtongshai of Baoxing County, 131 giant pandas have been officially taken out from the wild. Among them, 16 pandas have been sent to foreign countries as the "State Gift", and another 115 pandas transferred to zoos and research center in China. In addition, China also took about 153 giant pandas out from their natural habitat in Sichuan when the bamboo flowered in 1980s, and never returned them to the wild since then. Although capital punishment has

been introduced for poachers, illegal hunting continues. In May 1996 Chinese police uncovered the country's biggest wildlife smuggling ring in Gansu Province, arrested 12 people, and confiscated three panda skins. In June 1996, a Shaanxi farmer was caught selling a panda pelt for RMB 60 000

Bamboo flowering

While members of the order Carnivora, giant pandas have become almost exclusively vegetarians. Bamboo stalks and roots make up about 99% of its diet (Schaller 1985). According to the field records, Professor Hu Jinchu concluded that there are 47 species of bamboos on the diet of Giant Panda. Among them, 13 species are favorable food, 10 species are frequently food, and 24 species are edible sometimes. The giant panda also feeds on gentians, irises, crocuses, fish, vines, mushrooms, rice grass and occasionally small rodents. One adult panda must eat 10 to 20 kg of food each day to survive, and spends 10 to 16 h day feeding.

The differing varieties of bamboo go through periodic die-offs as part of their renewal cycle. The bamboo, at the end of its lifecycle will bloom and drop its seeds and then dies. Often vast areas of the bamboo forest disappear at the same time. In the past the giant panda responded to this phenomenon by moving to another area. But increased human settlement makes it difficult for the giant panda to reach new food supplies. Without the ability to move to new areas where have not been affected, starvation and death certainly occur for the giant panda. Such die-offs of the bamboo also put the giant pandas in more direct contact with farmers and poachers as they try to find new areas in which to feed. For example in the Wanglang Reserve, a population estimated at 196 individuals in 1969 had been reduced to only 10-20 by 1980s because lack of food (Menghu 1993). In 1983, large areas of arrow bamboo blossomed and then died across the Qionglai Mountain in Sichuan Province. In Pingwu County alone, 100 pandas starved to death then (MOF On <http://www.china.org.cn/ChinaInBrief/17e5414p.htm>). Bamboo die-off may however have been an important feature of the population dynamics of giant panda, with enforced emigration promoting out-breeding and maintenance of a healthy population. Generally died-back bamboo should take 10 to 20 years before it can support a panda population again (Scheller 1985; Taylor 1993).

Conservation

Conservation situation

Panda conservation began as early as 1940s when Chinese scientists carried out field research on the

species. In 1963, the government established Wolong as a forest reserve which later became better known as a panda reserve. Since the bamboo die-off in the Min mountains in the late 1970s, the state and local provincial governments have claimed about 19 panda reserves in Sichuan, Shaanxi and Gansu provinces in addition to Wolong Panda Reserve which is the biggest of all. It is home to 10 percent of the world's panda population with a total area of 200 000 hectares.

As early as 1992, the Chinese Ministry of Forestry began to carry out the Panda and Its Habitat Protection Project. The project is to be completed by the year 2000. The project includes: Improving the existing 14 panda reserves and set up another 14 reserves; Building 14 panda protection corridors that will link the different groups and facilitate the mingling of genes through cross breeding; Establish panda protection administration stations in each of the 22 counties where pandas are distributed; strengthen scientific research in artificial breeding and ecological preservation, and more rural development activities to reduce local people's dependence on forest products and wild animals in panda habitats. When fully implemented, it will provide protection for 95 per cent of the wild panda population.

Suggestion for panda reintroduction

Facing to the rapidly decline of wild population of giant panda, some people believe that the zoos and breeding centers can do a better job of caring for and breeding pandas than can be done in the wild, even though more die in captivity than in wild. In deed, the panda has one of the highest mortality rates of any endangered species. Sixty percent of the pandas born since China began captive breeding in 1963 have died within the first month. In fact, China caught about 260 giant pandas from wild, but the captivated populations have only successfully reproduced themselves one third. The results outside China are much worse. At least 42 living individuals have been brought out from China, but only five of their off-springs are living now (four in Mexico and one in USA, Lindburg, 1999). Further more zoo exhibits might create pressure for more importing, with the pandas sought more for show purposes than to help preserve the species.

However, in well-protected wild the panda populations are quite stable. For example, Professor Pan recorded nine births by four different radio-collared females. Only one of the cubs died before reaching one and half years. The high infant mortality rate in captivity might be behavioral or nutritional problems due to being caged. It is very clear that the *in-situ* protection of giant panda is better than captivated them in the zoo for protection *ex-situ*. Regarding to

the fact of food shortage and human population pressure in the currently habitats, reintroducing giant panda to its historical habitats where have better natural conditions, more food, and less human pressure might be a new issue for its protection.

Recently in 1999, China is launching a pilot program to release giant pandas living in captivity into the wild. The plan is to go into effect by 2005. If the program proves successful, two or three giant pandas will be released into the wild each year from Chengdu Giant panda Breeding and Research Center and another two will from Beijing Zoo. But, where and how to introduce these pandas to wild are still keeping unclear because there is no sound understanding about the potential sites. So it is necessary to establish some researches for looking and appraising the potential habitats for releasing the giant panda in wild.

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